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Enhancement of the Long-range Ultrasonic Method for the Detection of Degradation in Buried, Unpiggable Pipelines

The objective of this research is to improve and/or enhance a non-intrusive nondestructive technology already in use for pipeline inspections. This technique only requires access to the outside of the pipe. Refits and/or modifications are not necessary to assess the condition of a line using guided wave ultrasonic inspection. The research addresses three primary tasks:

1. To benchmark the test performance of the guided wave method against that of internal inspection vehicles (pigs) and to correlate guided wave data gathered in the field with the actual existing pipe conditions whenever the pipe is exposed for verification or removed for replacement.
2. Improving the guided wave ultrasonic capability to provide more quantitative data on anomalies that require interpretation.
3. And to introduce a new sound beam focusing technique for improved sensitivity and range of inspection.

Progress on this project for in the first six months was in accordance with the objectives defined for this time period. The following areas were investigated and the results are summarized as follows:

1. The parameters affecting guided wave propagation in a pipe continued in order to understand the differences in different wave modes. Work efforts during this period focused on the further development of low frequency guided wave test systems.
2. Finite element and boundary element modeling analysis continued the of study of the response from plane strain or two-dimensional defects for axisymmetric input, either longitudinal or torsional.
3. Preliminary Guided Wave focusing research has been initiated.
4. Guided wave inspections are now being performed on existing pipelines. Field situations where anomalies are identified are being evaluated by direct comparison, i.e., guided wave data vs. as-found pipe condition. These are being logged and described for further study. Currently 1830 feet of condemned pipe is available for correlation of Guided Wave Data collected in 2002 with a subsequent smart pig run. The pipe has been retained for direct visual comparison with the inspection data.

Questions concerning this project should be directed to the Team Project Manager as follows:

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